

REMARKS

Claims 60-74 are pending in this application. By this Amendment, claims 73 and 74 are added. Support for new claims 73 and 74 may be found at least on page 18, line 24 to page 19, line 25. No new matter is added by the above amendment. In view of at least the following, reconsideration and allowance are respectfully requested.

I. Claim Rejection under 35 U.S.C. § 103

The Office Action rejects claims 60-72 under 35 U.S.C. § 103(a) over Applicants' alleged Admitted Prior Art (AAPA) in view of U.S. Patent No. 6,531,191 (Notenboom), and further in view of European Patent Application No. EP 0930641 A2 (Kiguchi). This rejection is respectfully traversed.

Noteboom discloses that a ceramic layer 7, a ceramic layer 9, and a ceramic layer 11 form one functional film. The ceramic layers are individually dried and fired. Accordingly, Notenboom requires three steps for each layer: (1) a coating step; (2) a drying step; and (3) a firing step. Because each layer must be individually coated, dried, and fired, Notenboom requires that a total of nine steps must be performed - an iteration of the three steps for each layer identified above for each of the ceramic layer 7, the ceramic layer 9, and the ceramic layer 11.

Contrarily, the presently claimed combination of features requires less steps to form a functional material. For example, independent claim 60 recites, in part, (1) disposing first and second droplets over a substrate; (2) gasifying a first part of the first solvent component from each of the first and second droplets; (3) disposing a third droplet between the first and second applied films, the third droplet contacting at least one of the first and second applied films; (4) gasifying a first part of the second solvent component from the third droplet; and (5) sintering the first, second and third applied films to form a functional material. Thus the presently claimed combination of features, among other things, allows for a more efficient

method of manufacture of wiring substrates than the method of manufacture taught in the disclosure of Notenboom.

In particular, according to at least independent claim 60, a third droplet is applied without a first droplet and a second droplet being fired, thereby enhancing the adhesion of the particles contained in these three droplets. Collective firing of all these droplets enhances the bonding power of the particles. As explained above, in order to collectively fire them, it is necessary to form a dried functional liquid pattern. However, repetition of only the coating could not lead to the successful formation of a function liquid pattern because the adjacent droplets coagulate, forming a large pool. Meanwhile, the repetition of coating and drying for each droplet will increase the number of steps.

However, the presently claimed features make it possible to successfully form a functional liquid pattern with fewer steps - (1) depositing a first droplet and a second droplet so that the droplets are not in contact with each other; (2) drying the droplets; and (3) depositing a third droplet between them.

Moreover, not only does Notenboom fail to teach the collective sintering of multiple films in a single step to form a functional material, Applicants respectfully submit that Notenboom teaches away from such a feature. Indeed, Notenboom, column 1, line 55 to column 2, line 2, discloses, in part, "[t]he invention is based on the recognition that a sintering process which is carried out layer by layer leads to much less shrinkage in the plane of the layer than a process in which a complete, 3-dimensional product is sintered.... By building the 3-dimensional product up as it were of thin, sintered layers, a dimensional accuracy can be attained which is much greater than the dimensional accuracy which can be attained when the complete product is subjected to a single sintering process" (emphasis added).

It is well settled that in determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. See MPEP § 2141.02. To this end, a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. See MPEP § 2141.02 VI.

In this regard, Applicants respectfully submit that the combination of AAPA, Notenboom, and Kiguchi is improper and fails to establish a prima facie case of obviousness with which to reject at least independent claim 60.

To establish a prima facie case of obviousness, three basic criteria must be met: (1) there must be some suggestion or motivation to modify the reference or to combine reference teachings; (2) there must be reasonable expectation of success; and (3) the prior art reference must teach or suggest all the claim limitations. See MPEP § 2142.

Thus, because the applied reference Notenboom expressly states that the sintering process must be performed individually with each deposition layer, the Office Action fails to establish a prima facie case of obviousness. Indeed, even if the applied references were combined, pursuant to MPEP § 2143.01 V, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. Therefore, it is clear that the Office Action has failed to properly establish a prima facie case of obviousness with which to reject the presently claimed combination of features.

Additionally, even if Kiguchi is interpreted as teaching the deposition of droplets and subsequent deposition of fluid "on the areas devoid of the previously deposited fluid", as the Office Action asserts, because Notenboom appears to teach the sequential deposition, drying

and sintering of one droplet prior to the deposition of the next droplet, Kiguchi fails to cure the deficiencies of Notenboom.

AAPA, Notenboom, and Kiguchi, in any combination, do not teach, disclose or suggest the presently claimed combination of features. Specifically, the applied references, in any combination, fail to teach the step of collectively sintering multiple depositions. Rather, Notenboom teaches the individual sintering of each deposition prior to the deposition of another sequence of droplets. Therefore, AAPA, Notenboom, and Kiguchi, either individually or in combination, do not teach, disclose or suggest the subject matter recited in claims 60 and 71.

Claims 61-70 and 72 variously depend from claims 60 and 71. Because the applied references, in any combination, fail to render the subject matter of independent claims 60 and 71 obvious, dependent claims 61-70 and 72 are patentable for at least the reasons that claims 60 and 71 are patentable, as well as for the additional features they recite.

Accordingly, withdrawal of the rejections is respectfully requested.

II. New Claims

By this Amendment, claims 73 and 74 are added.

Independent claim 73 recites, in part, "forming a functional material by sintering the first applied films, the second applied films, the third applied films, the fourth applied films and the fifth droplets with a fifth light."

Similarly, independent claim 74 recites, in part, "forming a functional material by sintering the first applied films, the second applied films, the third applied films, the fourth applied films and the fifth droplets with a fifth light."

As discussed above, AAPA, Notenboom, and Kiguchi, in any combination, do not teach, disclose or suggest the step of collectively sintering multiple depositions. Therefore,

AAPA, Notenboom, and Kiguchi, either individually or in combination, do not teach, disclose or suggest the subject matter recited in claims 73 and 74.

Accordingly, allowance of the claims is respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,


James E. Olliff
Registration No. 27,075

Linda M. Saltiel
Registration No. 51,122

JAO:LMS/dqs

Attachment:

Request for Continued Examination (RCE)

Date: October 30, 2007

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461
